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In this study, one hundred 3- to 5-year-olds were selected for reading instruction during regular 12- to 30-minute periods for 4 to 6 months. The program was ordered to establish a high level of sustained daily control over the attentional and motivational processes of the children. Learning tasks were designed to facilitate the child's grasp of concepts critical to mastery of the perceptual-cognitive dimensions of beginning reading. The tasks were also designed to generate both analytic and synthesizing perceptual-cognitive styles to acquire basic structural dimensions. Children were pretested and posttested on word recognition, word generalization, and comprehension in sentence and paragraph reading. Of 63 children who completed the program, 46 learners scored 96 percent on the unit recognition test of reading competence. On word recognition, the total group recognized a mean of 95 percent of all words used. On word generalization, the total group scored a mean of 84 percent. A mean of 93 percent was obtained on sentence reading; and in paragraph reading, means of 92 percent and 81 percent were scored on word recognition and comprehension, respectively. The high word generalizing and comprehension levels suggest the effective involvement of cognitive processes through the analytic-structural approach. (DO)

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Developmental Learning as a Concept in Early Reading

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Paper presented at the biennial meeting of the Society for Research in Child Development, New York, March 30, ~~1966~~. 1967

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Developmental Learning as a Concept in Early Reading

The realization of the high potential which humans have for cognitive learning requires strategic control over learning conditions through time. Neither the concept of development nor the concept of learning alone provides a framework adequate to trace the ontogenesis of cognitive processes. The first concept has been limited by concern for identifying the characteristics of functioning at different phases of the life cycle, to the neglect of specific mechanisms and antecedent conditions. The second has focused on the mechanisms and tactical conditions under which learning occurs, too often regardless of age, developmental status, and the cumulative role of experience.

What apparently is needed is a concept of developmental learning, a framework which can take account, both of the long range strategies of development and the refined tactics for control of the proximal stimulus situation. There are a number of principles for gaining leverage over developmental learning in early childhood which I have been attempting to identify (Fowler, 1965b, 1966, 1967). Among salient principles are identification and analysis of structures, either of subject areas or language, in terms of component, structural-functional relations, networks and abstraction hierarchies; sequencing; psycho-cognitive diagnostic monitoring; pacing stimulus complexity; using sensori-motor, concrete based learning tasks and play activities appropriate to the characteristics of the child's developmental level; and structuring social psychological dimensions in small group learning situations to allow for both individualization and collaborative group processes.

Over the past three years, I have been carrying out a series of investigations at the University of Chicago Laboratory Nursery School on developmental learning of perceptual-cognitive processes in a variety of areas--physical concepts of space, color, number and the like; zoological and similar subject area concepts; and early reading.

These studies were designed to (1) identify and develop concepts for defining the structure and sequence of developmental learning problems in young children;

(2) to devise and test methods and materials for facilitating learning; (3) to develop tests of perceptual-cognitive development; (4) to assess the possibility for training teachers in this approach; (5) to evaluate the feasibility of these programs in a school setting; and (6) to determine the influence of systematic, longitudinal, cognitive stimulation upon socioemotional development.

The projects on early reading were focused on delineating the perceptual and cognitive dimensions of the reading process and designing techniques suitable for the young child's styles of functioning. Because of time limitations, this paper is largely based on preliminary analyses of data from the first year project in reading.

Procedures

The subjects in the entire reading program (two years) consisted of approximately 100, three-to-five-year-old children, drawn from the regular, middle class nursery school population. Following pilot experimentation the first year, about half the school population of 100 children were selected for reading instruction during each of the second and third years of the project. Children were selected according to teacher judgments of social and intellectual development, but some problem children were deliberately included, as well as a higher ratio of three-to-four-year-olds the final year.

Children were instructed in small groups of five to eight children during regular 15 to 30 minute project periods, interspersed between free play activity periods in the course of ordinary school sessions. Daily instructions continued about 4 to 6 months, depending on the time required for pre and posttesting, children's adaptation to school, and teacher style.

The reading program and methods were designed according to the conceptual model summarized above and, as applied to reading, discussed elsewhere (Fowler, 1964, 1965). Teachers were trained and materials, (including teacher guides and a

primer series) were composed by the experimenter, who was also principal of the nursery school. The primers combined a structural, linguistic and sequential rationale with a definite story line. Additional specific tasks and materials to follow the same rationale, were developed by the teachers. The seven primers (one added the second year) were constructed in terms of levels of complexity, systematically controlling such perceptual-cognitive variables as word frequency, length, usage and phonemic value, and punctuation, capitalization and length of line. The vocabulary and phonemic load varied from as low as four new words and one new phoneme, to as many as 21 new words and 14 new phonemes per primer. There was a total of 81 different words for the seven primers.

Measures

The measures of reading progress consisted of a pretest of words and letter grapheme recognition; a series of posttests, covering grapheme unit and word recognition, sentence and textual reading; and a running assessment of each child's primer reading progress.

The pretest measure embraced a small sample of words from the Gates Primary Reading Test, together with a sample of 10 high usage letters, assessed in capital and lower case letter forms by letter name, of which 5 were also tested in terms of common phonemic value

Each of the posttests were constructed from samples drawn from the total population of units and reading vocabulary represented by the seven primer stages of the program. Each child was tested at the primer level he attained. In addition to word recognition of basic primer program vocabulary, children were tested on word generalization, using unfamiliar and/or little exposed words. Comprehension as well as word recognition were tested in both sentence and paragraph reading.

Findings

Pretest Status: The mean chronological age and Peabody Picture Vocabulary Test IQ of the children were approximately 4 years and 5 months and 115, respectively.

On the reading pretest, children failed to recognize words above chance levels, but recognized a mean of 69 percent of the capital and 50 percent of the lower case letters, and discriminated a mean of 25 percent by phonemic value.

Reading Progress: During the first program year, of 63 children who began the program, 46 or 73 percent progressed through a mean primer level of 4.5 books. Seven children completed the second primer, 5 the third, 8 each completed Books IV and V and 18 completed Book VI. A number of children at the last level progressed further with other reading materials and texts. Seventeen children or 27 percent were not posttested, largely because they had made no substantial progress in learning to read and were early dropped from the program.

On the post tests of reading competence, the total group of 46 successful learrers recognized a mean of approximately 96 percent correct of the test graphemes on the unit recognition test. These tests varied from 5 to 9 units in length, depending on book level attained, and included both vowels and consonants.

On the word recognition posttest, the total group recognized a mean of about 95 percent correct of all words in the test, based on samples drawn from the basic primer programmed vocabulary. These tests embraced from 5 to 9 words, depending on book level attained. On a test of word generalization, containing from 4 to 9 words, the total group of 46 reading children scored a mean of about 84 percent correct. The generalization list of words was a list of unfamiliar or little exposed words which varied systematically in the initial, middle, or final grapheme from the original stimulus list.

A mean of about 93 percent was obtained on a two item sentence reading test by the group of 35 of the 46 children who were administered this test. In paragraph reading, which for this first program year was available only to the 18 Book VI level readers, means of approximately 92 percent and 81 percent were scored, respectively, on word recognition and on a 4 question comprehension test.

In a trend analysis of children's progress according to chronological age, the children were divided into two age groups; the younger embraced the ages between 3-5 and 4-4, with a mean of 4-0, and the older fell between 4-5 and 4-11, with a

mean of 4-9. These divisions were selected to provide a balance between age range and number in the subsample. The younger group of 18 children had a mean Peabody Vocabulary IQ of 112, and the older group of 27 children a Peabody IQ of 118. In reading, the younger group attained a mean Primer Level of almost IV (3.94), while the older children reached a mean level of almost V (4.89). The difference is largely accounted for by the fact that 15 of the 18 children who completed Book VI were in the older group. On the series of reading post tests, however, both groups scored in the same 90 percent range, except for word generalization and comprehension where both scored in the 80 percent range, with no consistent advantage accruing to the older children.

Discussion

The pattern of findings emerging from these investigations on development learning suggests the utility of approaches which attempt to apply systematic control of both the tactics of the total learning situation, and the long range developmental learning strategies. Results for the second program year appear to be substantially the same, except that the greater number and proportion of three year olds used may have widened the gap of teacher competence; one teacher was highly successful and another virtually failed completely with the young children.

The systematic analysis of structures of stimulus material and the learning situation may have aided teachers (of varying competence, several with little college education) to establish a high level of sustained daily control over attentional and motivational processes of most of the children. This control was reinforced by a careful ordering of the program in complexity, by dramatic play activity, and problem solving type tasks, which were attuned to the developmental characteristics of the children as well as to a discovery approach. The control was also buttressed by the way in which learning tasks were organized to facilitate the child's grasp of several concepts believed critical to mastery of the perceptual-cognitive dimensions of the reading process in the beginning stages. These included concepts of word and sentence structure, one-to-one correspondence between visual

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and auditory patterns, left-to-right sequencing, and the derivation and integration of meaning from word sequences. The learning tasks were also designed to generate both analytic and synthesizing, perceptual-cognitive styles to facilitate acquisition of basic structural dimensions. The high word generalizing and comprehension levels acquired by the children at all primer levels suggest the effective involvement of cognitive processes through this analytic-structural approach.

Many aspects remain to be analyzed or tested more elaborately in subsequent investigations, especially prediction and analyses of both teachers' and children's styles, and the general effects of different forms and methods of cognitive stimulation upon personality and perceptual-cognitive styles. There is preliminary evidence from our analyses as well as abundant evidence from impressions, that stimulation does not impede and may well facilitate socio-emotional development generally.

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